



515322

STATE OF MINNESOTA

Office Memorandum

DEPARTMENT *Health*

TO :

Jim Pantkanin (SE-WHME)
U. S. Environmental Protection Agency
Water & Hazardous Materials Enforcement
230 South Dearborn Street
Chicago, Illinois 60604

DATE: *10/15/81*

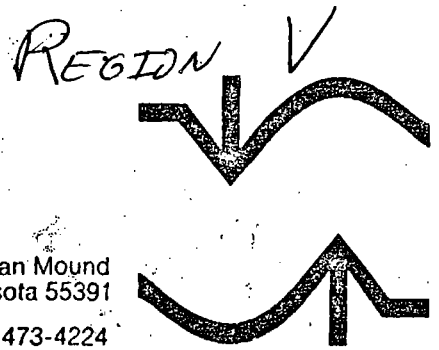
FROM :

PHONE: *612-296-5297*

SUBJECT:

Mike Convery
Hickok Report 918-13 : Information Deficiencies

This is the last working memorandum. Please try to get comments to me by the end of October.



545 Indian Mound
Wayzata, Minnesota 55391
(612) 473-4224

October 9, 1981

Mr. Michael Convery
Minnesota Department of Health
717 SE Delaware Street
Minneapolis, Minnesota 55440

Re: St. Louis Park Groundwater Contamination Study

Dear Mike:

Enclosed is memorandum Number G18-13 entitled, "Information Deficiencies" for the referenced project.

Respectfully submitted,

EUGENE A. HICKOK AND ASSOCIATES

A handwritten signature in dark ink, appearing to read "E. A. Hickok", written in a cursive style.

E. A. Hickok, P.E.
President

bt

Enclosure

cc: Richard Ferguson, MPCA
Marc Hult, USGS

reviewed 10/21/81
J. Parkman

TR1 EG-1
G18-13

SEPTEMBER 30, 1981

ST. LOUIS PARK GROUNDWATER CONTAMINATION STUDY -
INFORMATION DEFICIENCIES

THIS MEMORANDUM SUMMARIZES INFORMATION
DEFICIENCIES RELATED TO REMEDYING POLYNUCLEAR AROMATIC
HYDROCARBON (PAH) CONTAMINATION OF SOIL AND GROUNDWATER IN
ST. LOUIS PARK, MINNESOTA, AND REPRESENTS COMPLETION OF TASK 3020
OF THE REFERENCED PROJECT.

INFORMATION DEFICIENCIES

This memorandum summarizes information deficiencies recognized during the study of remedying polynuclear aromatic hydrocarbon (PAH) contamination of soil and groundwater in St. Louis Park. Further investigation of the topics discussed below is considered necessary for both assessment of the problem and successful implementation of remedial measures.

1. Extent of Aquifer Contamination

Wells in the St. Louis Park area which have been monitored for PAH do not include a periphery of uncontaminated wells in any aquifer. (Aquifer maps of wells displaying elevated PAH concentrations are contained in Memorandum G18-12 entitled "Gradient Control Well System.") Therefore, it is presently difficult to specify the maximum extent of PAH contamination in the aquifers. The extent of contamination in the Iron-ton-Galesville and Mt. Simon-Hinckley aquifers is of special concern due to the almost complete lack of direct information on PAH for these aquifers. A first approach toward investigation of water quality in these aquifers might be the drilling of test wells adjacent to the on-site Hinckley (W23) and Milwaukee Railroad (W38) multi-aquifer wells.

The extent of PAH contamination in the Middle Drift, Platteville, St. Peter and Prairie du Chien-Jordan aquifers could be further defined by the initial emplacement and sampling of new monitoring wells selected from those proposed for the gradient control well system monitoring plan. Locations of the proposed new monitoring wells in these four aquifers, including those selected for initial

delineation of groundwater quality, are shown in Figures 1 through 4. Areas of interest in the Middle Drift and Platteville aquifers include Bass Lake and the pond at 32nd and Oregon, north of the former site. These two surface waters may have been sources of PAH to the Middle Drift and Platteville. Also of concern is whether Middle Drift groundwater contamination exists above the buried bedrock valley. Leakage from the Middle Drift through the buried valley could have significant impacts on water quality in the St. Peter. Further definition of groundwater quality is needed to the south and east of previously monitored wells in the St. Peter and to the east of previously monitored wells in the Prairie du Chien-Jordan.

2. Extent and Nature of PAH "Source" Area

Limited data at the south of the former Republic site indicate that the area behaves as a continuing "source" of groundwater contamination. Two Middle Drift monitoring wells, W6 and W13 (see Figure 5), exhibit PAH concentrations exceeding the reported solubilities in water by several orders of magnitude. This suggests that a distinct fluid zone with a predominantly hydrocarbon character exists in the Middle Drift aquifer. Wastes from the former creosoting operation were discharged to wetland peat deposits overlying the same area, thus the peat is probably also a source of groundwater contamination. However, there are no PAH data from the peat or its pore fluid in the suspected "source" peat zone (see Figure 5). *MRI data*

Systematic soil investigations must be carried out in order to define the extent of peat and the pattern of PAH contamination there. Existing soil borings show that peat is widespread

throughout the vicinity of the former Republic site. It is suggested that peat deposits be fully delineated and that a general picture of PAH contamination in the peat be obtained throughout the indicated area in Figure 5. More intensive investigation should be conducted in the suspected "source" peat zone.

Additional monitoring wells would be required in the Middle Drift aquifer to define the areal extent and volume of "source" fluid there. Pumpout wells have been recommended for removing this fluid. Appropriate means of disposal for the fluid can be determined after the volume of the source fluid has been estimated.

3. Other Contaminants and Sources

Contaminant sources other than the former creosoting operation may exist in the St. Louis Park area. The possible presence of such sources and contaminants not identified in previous soil and groundwater investigations represents an information deficiency relevant to basic assessment of the problem.

4. Site-Specific Hydrologic Parameters

Limited information exists pertaining to the hydraulic characteristics of the aquifers and aquitards in the St. Louis Park area. Knowledge of aquifer transmissivity is of particular importance because the area of influence of a gradient control well in the Middle Drift, Platteville, St. Peter or Prairie du Chien-Jordan aquifer is dependent on this parameter. The remedial pumping plans proposed for these aquifers were conservatively

designed to account for the uncertainties in transmissivity information. Pumping tests should be conducted to determine the transmissivities of these aquifers in the St. Louis Park area since this information is essential to effective operation of the gradient control well system. The proposed gradient control and monitoring wells could be used for such tests.

Further investigations to determine vertical hydraulic conductivities and effective porosities of the aquitards would allow better estimation of water quality impacts in aquifers due to leakage.

5. PAH Sorption

Little is known about the sorbing behavior (i.e., adherence to the aquifer matrix) of PAH in the St. Louis Park groundwater system. This information deficiency is significant because the occurrence of sorption will increase the amount of time required for recovery wells to remove PAH compounds. From available information, it is inferred that PAH sorption is significant in the Middle Drift and peat, but not in the bedrock aquifers. Further study is needed to confirm and quantify these assumptions. Investigations into PAH sorption in the aquitards would also be beneficial for estimating water quality impacts in aquifers due to leakage inflow.

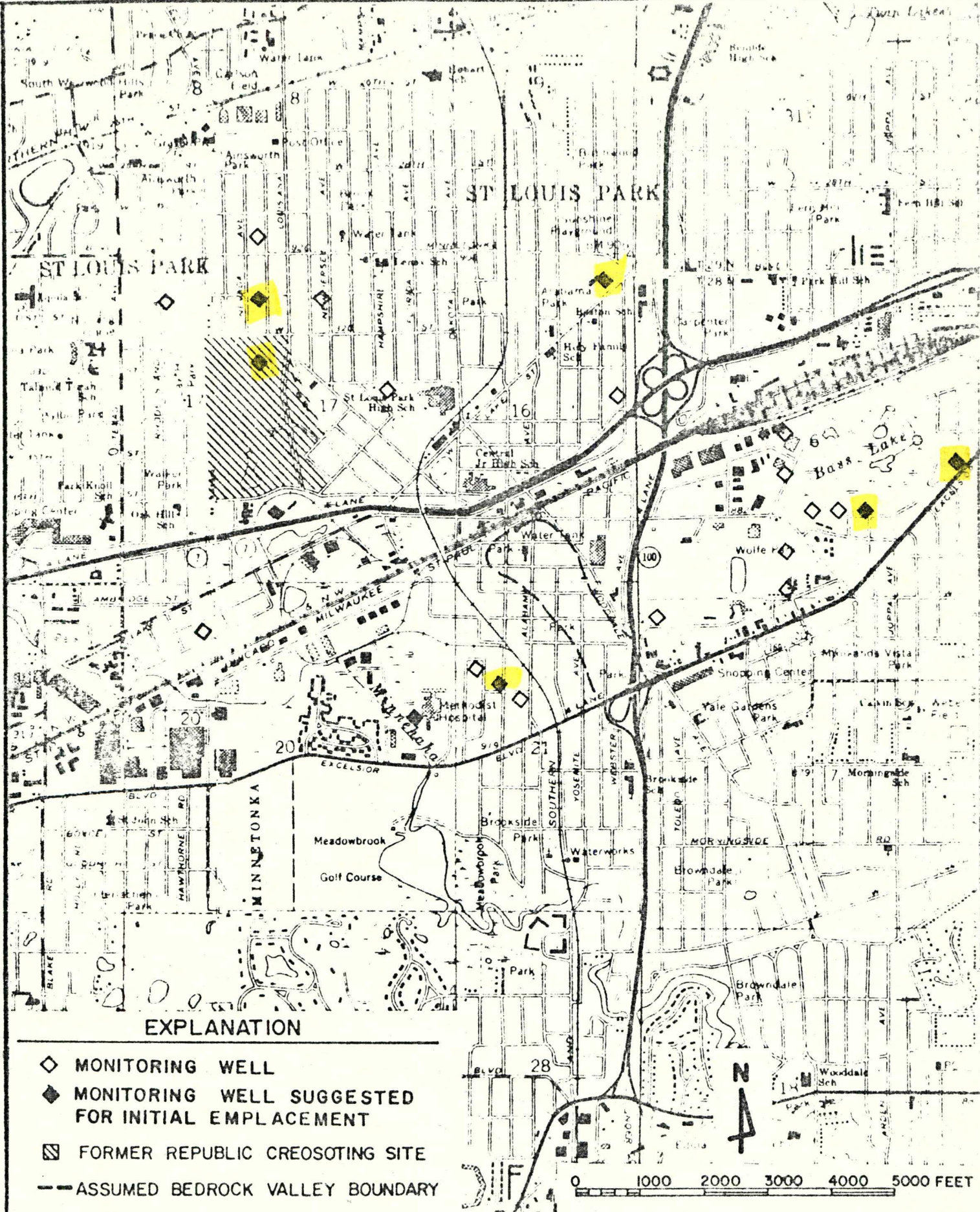
Literature information indicates carcinogenic PAH are more sorptive than other PAH. Sorption of carcinogenic PAH should thus be addressed in future investigations.

GCA work

6. Water Treatment

Treatment for potable use is a disposition alternative for discharge from St. Louis Park municipal wells incorporated in the gradient control well system. Results of laboratory tests reported in the literature and a small scale pilot plant study in St. Louis Park indicate treatment technology is available to reduce PAH concentrations in this discharge to proposed potable criteria. However, little or no information exists pertaining to the feasibility of applying these treatment techniques on the scale of the proposed operation in St. Louis Park.

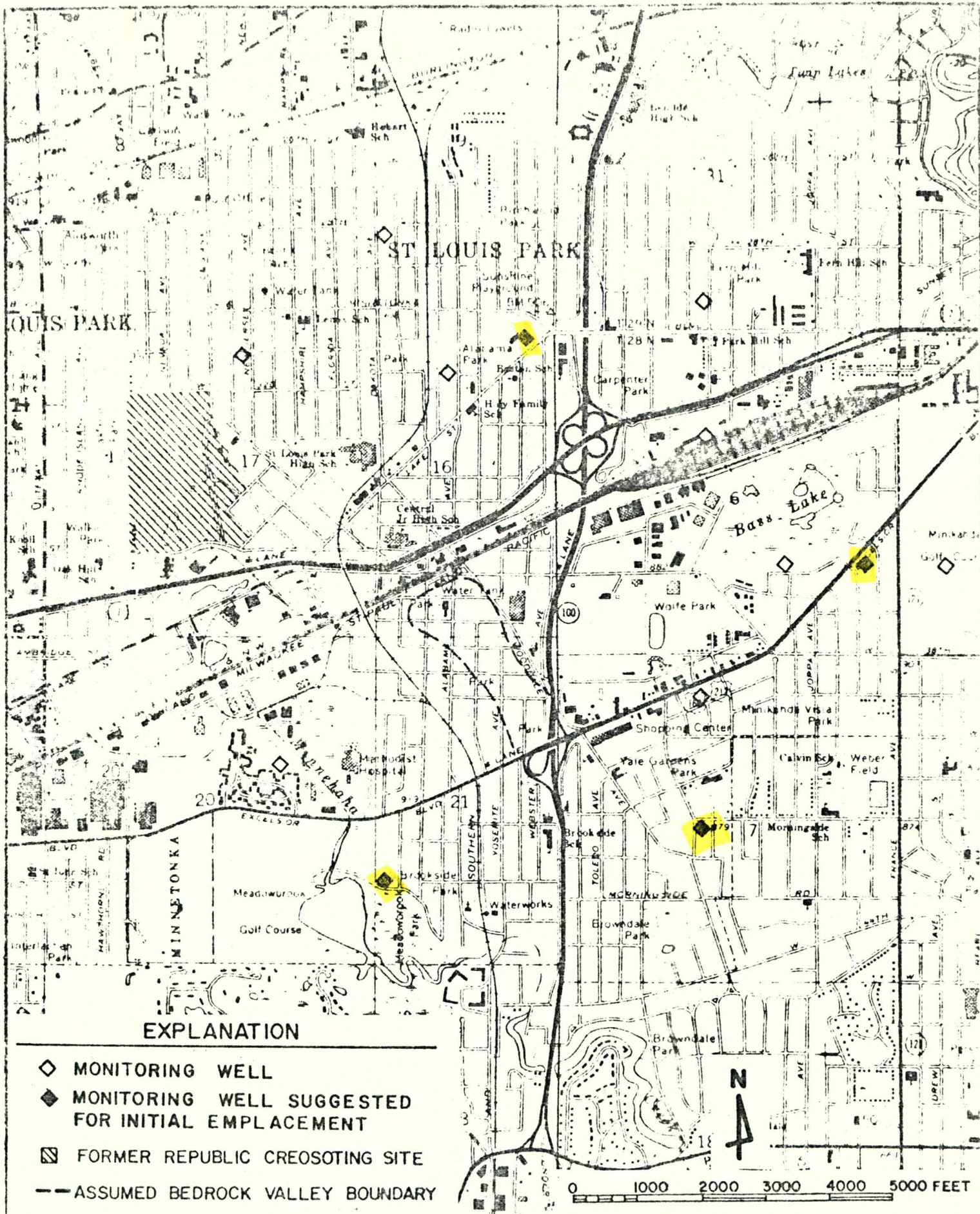
The possible presence of contaminants not identified in previous groundwater sample analyses also represents an information deficiency relevant to the feasibility of treatment for potable use.



PROPOSED NEW PLATTEVILLE
MONITORING WELLS

E.A. HICKOK & ASSOCIATES
HYDROLOGISTS-ENGINEERS
MINNEAPOLIS-MINNESOTA

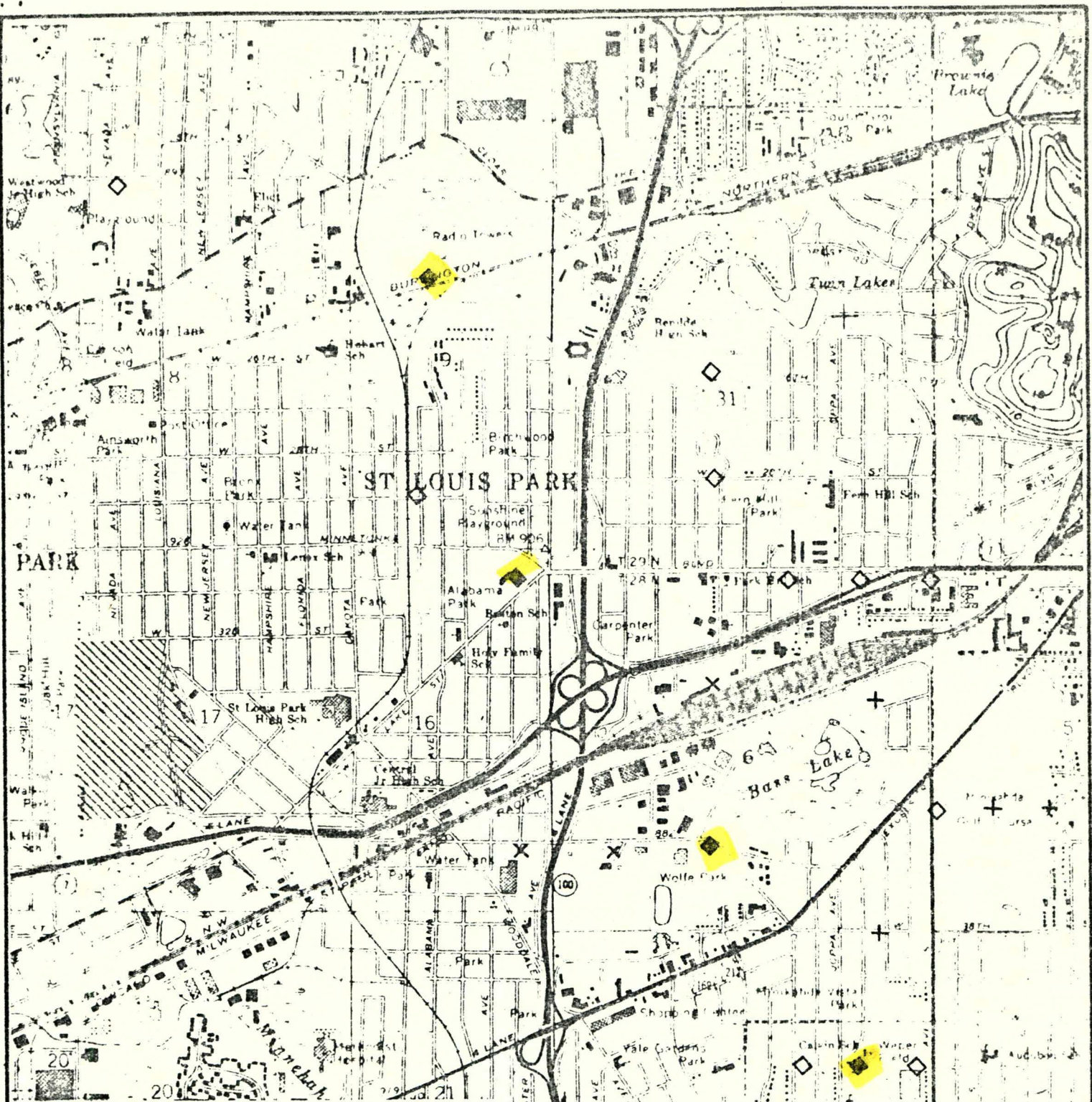
2



PROPOSED NEW ST. PETER
MONITORING WELLS

E.A. HICKOK & ASSOCIATES
HYDROLOGISTS-ENGINEERS
MINNEAPOLIS-MINNESOTA

3



EXPLANATION

MONITORING WELLS

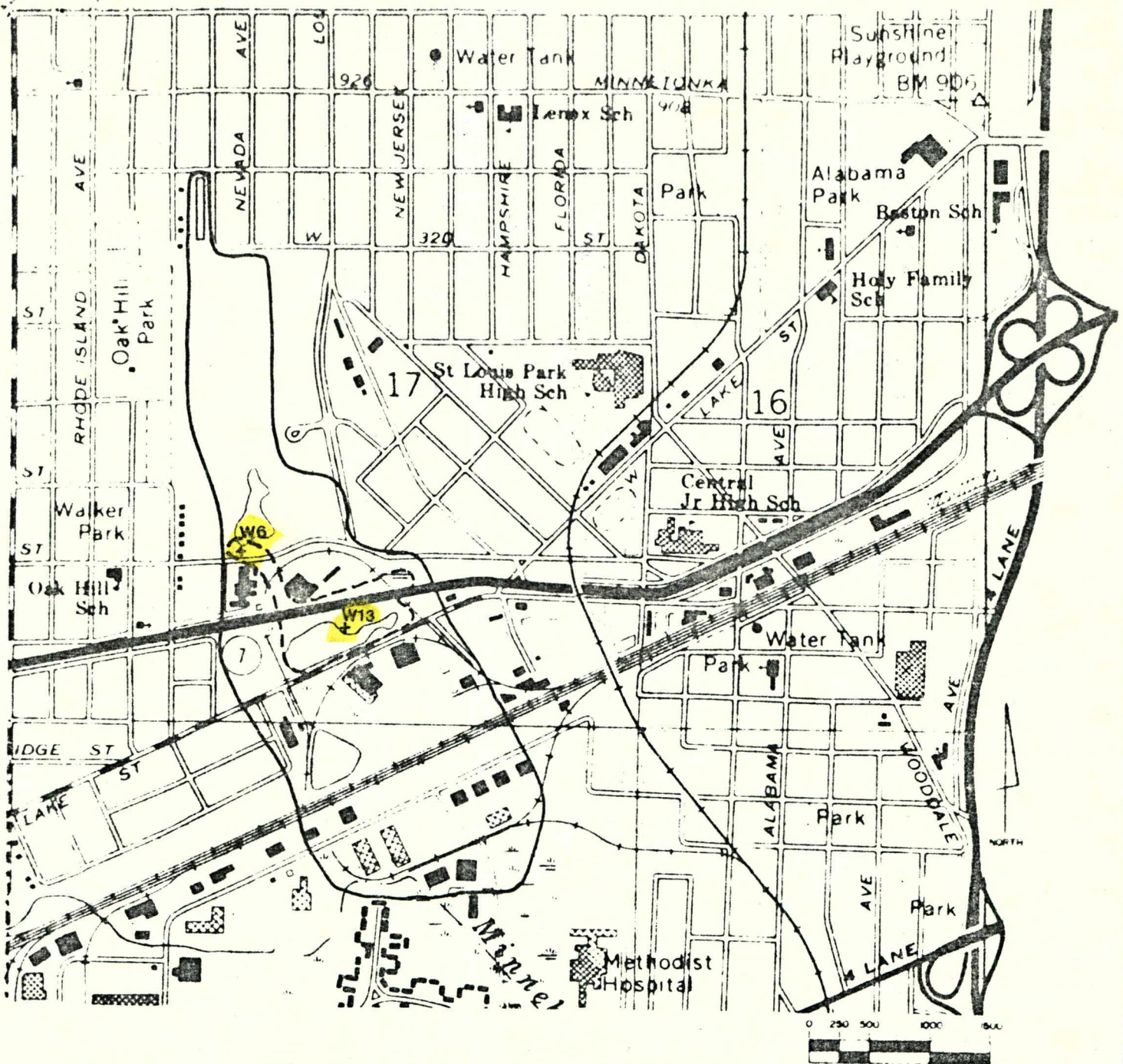
- X REMEDIAL PLAN 1
- + REMEDIAL PLAN 2
- ◇ EITHER PLAN
- ◆ SUGGESTED FOR INITIAL EMPLACEMENT

▨ FORMER REPUBLIC CREOSOTING SITE

E.A. HICKOK & ASSOCIATES
HYDROLOGISTS-ENGINEERS
MINNEAPOLIS-MINNESOTA

PROPOSED NEW PRAIRIE DU CHIEN - JORDAN
MONITORING WELLS

4



LEGEND

- + MIDDLE DRIFT WELLS WITH PAH EXCEEDING SOLUBILITIES
- SUSPECTED "SOURCE" PEAT ZONE
- AREA SUGGESTED FOR PEAT DELINEATION AND PAH SAMPLING

PAH "SOURCE" AREA

E.A. HICKOK & ASSOCIATES
HYDROLOGISTS-ENGINEERS
MINNEAPOLIS-MINNESOTA

5